

said image sensing unit which is obtained before emission of radiation from an output from said image sensing unit which is obtained after emission of radiation from the radiation source is stopped.

16. (Amended) An image sensing method for a radiation image sensing apparatus including an image sensing unit which senses an object image by converting the object image on the basis of radiation from a radiation source passing through an object into an electric signal, comprising the step of stopping emission of radiation from the radiation source on the basis of a signal obtained by non-destructively reading the electric signal converted by the image sensing unit to sense the object image by the image sensing unit.

REMARKS

Applicants request reconsideration and allowance of the present application in view of the foregoing amendments and the following remarks.

Claims 1-16 are pending in the present application. Claims 1 and 16 are the independent claims.

Claims 1, 2, 6, 8, 12, 15, and 16 have been amended. No new matter has been added.

The Office Action objected to Figures 9-12B for failing to include a legend such as "Prior Art." By separate paper filed concurrently herewith, Applicants seek approval to add the legend --PRIOR ART-- to those figures. Favorable consideration is requested.

The Office Action indicates that the Office did not consider features of Claims 1, 2, 6, 8, 12, 15, and 16 reciting "adapted to" or "capable of." While not conceding the propriety

of this action, by the present Amendment, Claims 1, 2, 6, 8, 12, 15, and 16 have been amended in a manner that is believed to obviate this issue.

Claims 1-7 and 16 stand rejected under 35 U.S.C. §103 as being obvious over the conventional x-ray apparatus arrangement illustrated in Fig. 9 of Applicants' disclosure ("the conventional x-ray apparatus") in view of U.S. Patent No. 5,528,043 (Spivey, et al.). Claims 8-15 stand rejected under 35 U.S.C. § 157 as being obvious over the conventional x-ray apparatus and Spivey, et al., in further view of U.S. Patent No. 5,778,044 (Bruijns). These rejections are respectfully traversed.

The rejection of Claims 1-7 and 16 under 35 U.S.C. §103 should be withdrawn because the asserted citations do not teach or suggest all of the features of these claims. Independent Claim 1 recites, inter alia, a control circuit which stops emission of radiation from the radiation source on the basis of a signal obtained by non-destructively reading the electric signal converted in said image sensing unit to sense the object image by said image sensing unit. Independent Claim 16 recites a similar feature in method form. However, Applicants respectfully submit that none of the conventional x-ray apparatus, Spivey, et al., or Bruijns alone or in combination, assuming, arguendo, that these documents can properly be combined, teaches or suggests at least this feature recited in independent Claims 1 and 16.

By this feature, the claimed invention can control radiation emission without using a phototimer.

The conventional x-ray apparatus uses a phototimer to control the emission of radiation from a radiation source. Absent from the conventional x-ray apparatus is any teaching or suggestion of non-destructively reading the electric signal converted in the image sensing unit

to sense the object image by the image sensing unit or stopping emission of radiation from a radiation source on the basis of the non-destructively read signal.

Spivey, et al. relates to an x-ray image sensor and teaches non-destructively reading out a pixel signal. However, Spivey, et al. does not teach or suggest stopping emission of radiation from a radiation source on the basis of the non-destructively read signal.


Regarding the rejection of Claims 8-15, Bruijns relates to an x-ray examination apparatus including an image pick-up apparatus with a correction unit and is cited for its teachings of: (1) a control circuit having a pattern recognition circuit, a detection circuit, and a generation circuit; (2) an addition circuit; and (3) a difference circuit. (Office Action, pages 4 and 5). Applicants submit that Bruijns adds nothing to the teachings of Spivey, et al. or the conventional x-ray apparatus that would remedy the aforementioned deficiencies.

For the foregoing reasons, Applicants submit that the independent claims patentably define the present application over the citations of record. Further, the dependent claims should also be allowable for the same reasons as the base claim from which they depend and further due to the additional features that they recite. Separate and individual consideration of each of the dependent claims is respectfully requested.

Applicants submit that the present Amendment is responsive to each of the points raised by the Examiner in the Official Action and submits that the application is in allowable form. Favorable consideration of the claims and passage to issue of the patent application at the Examiner's earliest convenience earnestly are solicited.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,

A handwritten signature in dark ink, appearing to read "M. Kondoudis", is written over a horizontal line.

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APPENDIX

VERSION SHOWING CHANGES MADE TO CLAIMS

1. (Amended) A radiation image sensing apparatus comprising:

an image sensing unit which [is capable of non-destructive reading, adapted to sense]
senses an object image by [allowing] converting the object image on the basis of radiation from a
radiation source [to pass] passing through an object into an electric signal; and

a control circuit [adapted to perform control to stop] which stops emission of radiation
from the radiation source on the basis of a signal obtained [from said image sensing unit by
non-destructive reading in the image sensing operation] by non-destructively reading the electric
signal converted in said image sensing unit to sense the object image by said image sensing unit.
2. (Amended) An apparatus according to claim 1, further comprising a
switching circuit [adapted to switch] which switches reading modes of said image sensing unit,
said switching circuit switching the reading mode of said image sensing unit to a non-destructive
reading mode in the image sensing operation.
6. (Amended) An apparatus according to claim 3, wherein a switching
transistor [adapted to select] which selects a pixel portion in a row direction is connected in
series with the reading transistor.

8. (Amended) An apparatus according to claim 1, wherein said control circuit comprises a pattern recognizing circuit [adapted to perform] which performs pattern recognition on the basis of an output from said image sensing unit, a detection circuit [adapted to detect] which detects a radiation amount on the basis of the pattern recognition result obtained by the pattern recognizing circuit, and a generation circuit [adapted to generate] which generates a reference value for a most appropriate radiation amount on the basis of the pattern recognition result obtained by the pattern recognizing circuit.

12. (Amended) An apparatus according to claim 8, wherein said control circuit includes an addition circuit [adapted to add] which adds outputs from said image sensing [means] unit.

15. (Amended) An apparatus according to claim 1, further comprising a difference circuit [adapted to obtain] which obtains a radiation image sensing output by subtracting an output from said image sensing unit which is obtained before emission of radiation from an output from said image sensing [means] unit which is obtained after emission of radiation from the radiation source is stopped.

16. (Amended) An image sensing method for a radiation image sensing apparatus including an image sensing unit which [is capable of non-destructive reading and adapted to sense] senses an object image by [allowing] converting the object image on the basis of radiation from a radiation source [to pass] passing through an object into an electric signal,

comprising the step of [performing control to stop] stopping emission of radiation from the radiation source on the basis of a signal obtained [from said image sensing unit by non-destructive reading in the image sensing operation] by non-destructively reading the electric signal converted by the image sensing unit to sense the object image by the image sensing unit.